division forming the door. A "cell" inside, inclosed by curtains, gives access to the specimens; by this contrivance it is hoped that the dust will be excluded to a great extent.

Accommodation for large specimens, as, for example, portions of stems and sections of various kinds of wood, such as oak, walnut, pine, cedar, and other dicotyledons, and trunks of palms, cycads, tree-ferns, bamboos, and other striking examples of the vegetable kingdom, is provided for by three tall metal and glass cases 14 feet high, occupying the floor-space in the centre of the gallery.

One-half of the main gallery is partitioned off from the public room, and fitted up with cabinets for the reception of the *Herbarium*, the nucleus of which was obtained by Sir Joseph Banks and Solander in their voyage round the world with Captain Cook. This first series of cabinets is entirely occupied with the flowering plants, which are all fastened on single sheets of paper. The Pavilion contains similar cabinets for the reception of the British plants and Filicinæ, whilst the room above in the tower is intended for the Cryptogamia. Down the centre of the large room are cabinets fitted to receive the great collection of fruits and seeds, each being placed near its appropriate family in the Herbarium on either side. These inner rooms, with the valuable library attached to them, are of course only available for purposes of study, but are always accessible to the botanical student and worker.

On the south-west side of the Index Museum, the gallery on the second floor which corresponds with that appropriated to Botany is designed to contain the great collection of Recent Osteology; that on the first floor is to be devoted to stuffed animals, and the front ground-floor gallery to birds. The eight galleries in rear of the main building on the west side will be appropriated to the Reptilia, Fishes, and Invertebrata. The collections preserved in spirits are to be placed in a special building at the north end of these galleries. The basement on the west side contains sixteen studies and work-rooms and a large open space well fitted for workshops and stores.

The Assistant-Secretary (Mr. J. T. Taylor) is provided with offices adjoining the Board Room on the first floor above the British Zoological Hall. The Superintendent, Prof. Owen, C.B., and the Keepers of Geology (Dr. H. Woodward, F.R.S.), of Mineralogy (Mr. L. Fletcher, M.A., F.G.S.), and of Botany (Mr. W. Carruthers, F.R.S.), have each a study in the central towers on either side the entrance.

There are a few scientific men who still strongly protest against the removal of the Natural History Collections from the old to the new building, on the ground that the locality is inconveniently far west, and that they are thereby precluded from using the Collections so freely as heretofore. One of the strong grounds for protesting against the removal has been the serious inconvenience arising from the separation of the collections from the great National Library. This injury will however be gradually removed by the formation of a new Natural History Library in the present building, a vote for which has been already taken.

The comparatively small band of scientific men who use the Natural History Museum for purposes of special work and study, would always do so wherever the collections happened to be located.

So too the holiday-makers, who come to the Museum merely to be amused, will as willingly travel to South Kensington as to the Regent's Park Zoological Gardens, or to the Crystal Palace.

Undoubtedly the highest aim and use of our great National Natural Historical Collections should be to impart instruction to the young and rising generation, and afford every facility for the advancement of our scientific students, and the question whether they are now conveniently placed is mainly for them to answer. If in the future South Kensington is to become a great centre of scientific instruction, then, and not otherwise, the Natural History Collections have been placed in their most suitable position.

We cannot conclude this hasty notice without stating that the old restrictions as to days of admission have all been swept away, and the collections will from and after the 18th be open daily to the public, save on Sundays, Christmas Day, and Good Friday, and other public fast days, &c.; good and cheap guide-books are also to be ready for the 18th.

For this and other concessions the public are mainly indebted to the untiring energy and determination of the present principal Librarian, Mr. Edward A. Bond, LL.D., who has also been the means of introducing many necessary and useful reforms into the old building; not the least being the electric light, which it may be hoped will ere long cast its beams over the collections in the Natural History Museum, Cromwell Road, South Kensington.

TEXT-BOOK OF MECHANICS

A Text-Book of Elementary Mechanics, for the Use of Colleges and Schools. By Edward S. Dana, Assistant Professor of Natural Philosophy in Yale College. (New York: John Wiley and Sons, 1881.)

THIS is a small-sized book of 290 pages printed in fairly clear type, and bound in an unpleasant-looking cover, and we learn from the preface that it has been prepared to meet the special wants of Yale College instruction. An endeavour has been made to dwell more fully than usual on the principles of the subject, at the same time illustrating these principles in their practical bearings by descriptions of various machines and appliances, while no mathematical knowledge beyond the rudiments of algebra and trigonometry is required. From this it may be presumed that the book is intended for a very elementary class of students, at a lower stage, if possible, than "Poll" men at Cambridge, or else that it aims at assisting self-education by supplying the place of a tutor. An undoubtedly good feature in the book is the collection of examples, some of which are interspersed in the text, and others collected in a body at the end, where the answers are given. The metrical and ordinary units are both employed. These examples are perhaps the only part of the book which would be of any value to teachers in this country. With regard to the main subject-matter of the book, Dynamics is placed first, and Statics follows, with a chapter on the Pendulum at the end. The definitions and the explanation of the principles of the subject, though aiming at fulness and clearness, are not always so satisfactory as might be wished. A tendency to looseness of expression sometimes counter-

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balances the value of the fuller explanation. To explain *solidity* we are told that "A solid is characterised by a greater or less degree of rigidity," which in the absence of a separate definition of rigidity leaves us much where we were before. Again, the definition of a *liquid* is this, "A liquid is characterised by its mobility; the molecules are free to move about each other, and the liquid takes the shape of any containing vessel," which is equally true of a *gas*. The proof of the formula $S = \frac{1}{2}ft^2$ is clenched by the proposition that "when two sets of variable quantities, which are always equal, simultaneously approach their limits, these limits are equal," which is suddenly introduced without any explanation of its meaning. This, in a book intended for beginners unacquainted with the idea of a "limit," would be likely to cause some bewilderment. There is a chapter devoted to Work and Energy, as should be the case with all text-books of mechanics nowadays.

In the dynamical section there is an entire omission of "Sliding in Chords of a Vertical Circle" and the pretty problems connected with it. In the statics there is no mention of the stability or instability of equilibrium of one curved surface rolling on another. The micrometer screw surprises us by appearing with the mechanical powers alongside of the wheel and axle and differential screw.

As the compiler has not acknowledged his indebtedness to other works, it is difficult to say how much of this book is original. But we seem to catch echoes of Ganot's "Physics" and of Goodeve's two text-books on Mechanics and Mechanism here and there. For instance, Articles 7, 8, 107, 111 remind one of Ganot, Articles 197, 207, 209, 239 of Goodeve. The woodcuts, some of which are good, and others (*e.g.* those in the chapter on Centre of Gravity) very indifferent, are 190 in number. Some of them are apparently reproductions of woodcuts in English books. We instance Figs. 44 and 175, which are strikingly like Figs. 365 [Joule's apparatus] and 19 [block and tackle] in the eighth edition of Ganot's Physics, translated by Atkinson, and Figs. 142*a*, 150, 152, 155 (in Dana), which bear a very close resemblance to Figs. 49, 58, 110, 113 respectively in Goodeve's "Principles of Mechanics," second edition, Fig. 117 in the latter having apparently supplied Dana's three figures, 162, 163, 164 [on Pulleys]. Fig. 145 in Goodeve's "Elements of Mechanism," fifth edition, may well have been the original of Dana's Fig. 156.

It would have been graceful in the compiler of this work to have expressed his acknowledgments to the two excellent little text-books of Goodeve. On the whole, with the reserve above made in favour of the "examples," we think that neither English teachers nor English students will be the losers if they continue to use already existing English text-books of Mechanics, and leave this American competitor to find an audience on the other side of the water.

CONSCIOUS MATTER

Conscious Matter; or, The Physical and the Psychical Universally in Causal Connection. By Stewart Duncan. (London: David Bogue, 1881.)

AS the title of this little work sufficiently indicates, the aim of its writer is to furnish a scientific basis for the theory of materialism in the region of mind. It is doubtful whether at this time of day anything very original can be said upon this topic, but Mr. Duncan has succeeded in placing some of the facts in a stronger light than previous writers. The facts to which we allude are those which he calls the "analogies" between forces and feelings. Up to a certain point it is by every one recognised that there is some quantitative relation between neurosis and psychosis; mental processes are universally known to entail wear and tear of cerebral substance. Mr. Stewart Duncan traces this quantitative relation as much into detail as he can, by setting forth in a series of twelve "analogies" the resemblances between forces and feelings. These "analogies" are far from being unopen to criticism severally; but here we shall merely mention what they are, as there is more important criticism to apply to them collectively. The analogies are that feeling and force are each without extension, both related to matter, have "plurality predicable of them as respects their locality," are diverse, have time-extension or duration, also the quality of degree and capability of being compounded or combined, are respectively transmutable *inter se*, &c. Doubtless, as Mr. Duncan observes, such analogies, or, as we should prefer to call them, parallelisms, might be largely multiplied; but what would any number of such parallelisms prove? Not, surely, what Mr. Duncan desires them to prove, viz. that forces stand to feelings in the relation of causes to effects. So far as the tracing of such mere parallelisms is concerned, we might almost as reasonably conclude the recent earthquake at Chio to have been the cause of this review, in that they each possess extension, have diverse parts, and so on. In order to establish a relation of causality we should require to show that the observed parallelism is due to that relation; we cannot argue from the observed parallelism as itself sufficient proof of such relation. Were this not so, there would be no need for Mr. Duncan or any one else to write a book on "The Physical and Psychical Universally in Causal Connection"; for as the fact of a constant parallelism between neural processes and mental processes is now no longer an open question, were mere parallelism sufficient to establish proof of causality, materialism would now be a demonstrated theory.

It is needless here to go into the whole question as to the relation of body and mind, or to point out all the shortcomings of materialism as a philosophical theory. But it is a defect in Mr. Duncan's work that he does not attempt to meet some of the most formidable of the difficulties with which this theory is beset. Thus he does not consider the fact that what we know as matter and force we know only as affections of mind, and therefore that in all speculations upon the nature and potentialities of the former, we already by implication have necessarily assumed priority of the latter. Nor does he seek to explain the apparent want of equivalency between supposed physical antecedents and supposed mental consequents—why it is that the brain of a Newton required less nourishment than that of an elephant. Lastly, the greatest of all the difficulties is not adequately treated—that, namely, which is connected with the doctrine of the conservation of energy. Are we or are we not to suppose that thought has a mechanical equivalent? If materialists say that we are, then thought itself becomes a mode of

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